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MINERALOGY.—*Hopeite from the H. B. mine, Salmo, B. C.*
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The mineral hopeite, a hydrous zinc phosphate, occurs very sparingly along with smithsonite, calamine, hydrozincite, spencerite, hibbenite, and cerusite at the H. B. mine near Salmo, B. C. It is remarkable that the ore as mined and shipped is almost entirely free from sulphides even on the 300-foot level. From this mine two new zinc phosphates, spencerite and hibbenite, have been recently described. The phosphates occurred in considerable quantity in a cave from which almost 100 tons were sent to the smelter. Calamine and smithsonite appear to be less prominent in this ore than the phosphates, which in places occurred in very pure stalactitic masses weighing at least ten pounds. In the stalactitic growths the central core is always spencerite, while the outer zone is principally calamine. There is often a solution zone between these two, and in these solution cavities small bright crystals of hopeite are found attached to the spencerite by which they were at one time completely enclosed. In general these crystals do not exceed 3 mm. in length, although some attain a length of 1 cm.

Chemical properties. As the amount available was insufficient for a quantitative analysis the mineral was subjected to qualitative tests and found to respond in all respects to the reactions of hopeite. Heated in the closed tube it yields water. In the

forceps it fuses quietly to a clear glass, which is not yellow when hot.

Physical properties. The specific gravity, determined by means of a solution of potassic mercuric iodide, is 3.03. Under the microscope the crystals exhibit parallel extinction in the prismatic zone. There are three cleavages corresponding to the three pinacoids. The luster is vitreous except on the macropinacoid, which is pearly.

Crystallographic properties. The three crystals measured were similar as to habit and forms present. The macropinacoid is generally the predominant form. The prism (120) is usually well developed, while of the terminal faces the most prominent are the unit pyramid (111) and the unit macrodome (101). The other terminal faces are usually quite small, but, considering their size, remarkable for the accuracy with which they can be measured. The measurements on the two large crystals, while satisfactory, are somewhat less concordant than those obtained from the third crystal, which is only 2 mm. in length. The following forms were observed:

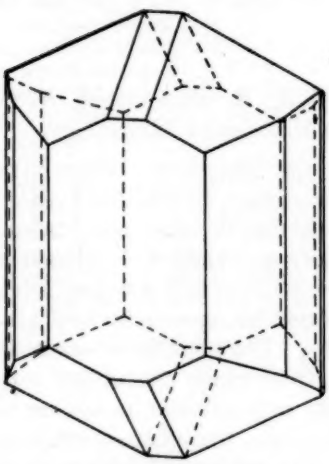

Fig. 1. Hopeite from British Columbia.

(a) Pyramids.....(111) and (133)
(b) Brachydomes.....(011) and (021)
(c) Macrodomes.....(103), (101), and (201)
(d) Prisms.....(670), (120), (5.11.0), (130), (3.11.0), and (160)
(e) Pinacoids.....(010) and (100)

The above list contains all the forms observed by Spencer on crystals from Rhodesia except the pyramid (233). The form (201) observed by Lévy in 1837 on material from Aix-la-Chapelle

is represented by one face on crystal No. 2. The following forms have not been previously observed:

(021) represented by five faces out of a possible six on the three crystals measured,

(670) observed on two crystals,

(3.11.0) shown on one crystal.

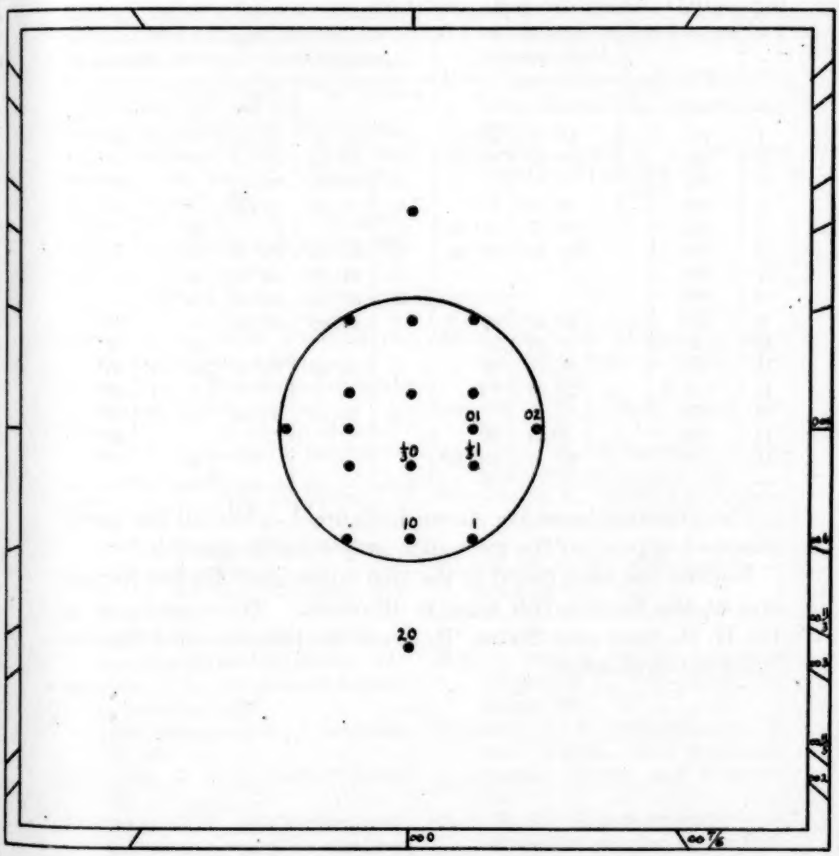

Fig. 2. Gnomonic projection of hopeite from British Columbia.

From crystal No. 1 the polar elements were found to be $p_0 = 0.8277$; $q_0 = 0.4720$, corresponding to the axial ratios a : b : c : : 0.5703 : 1 : 0.4720. These ratios are slightly lower than those obtained by previous observers, though they are very near the values of Lévy—a : b : c : : 0.5723 : 1 : 0.4718.

The details of the measurements given in the following table were obtained from crystals 1 and 2 except the values for the form (103), which are from the third.

NO.	FORM	NO. 1 OBSERVED			NO. 2 OBSERVED			CALCULATED	
		Faces	ϕ	ρ	Faces	ϕ	ρ	ϕ	ρ
1	111	4	60° 17′	43° 37′	4	59° 51′	43° 20′	60° 18′	43° 37′
2	133	2	30° 07′	28° 35′	4	30° 22′	28° 52′	30° 19′	28° 40′
3	011				2	0° 35′	25° 51′	0°	25° 16′
4	021	1	0° 10′	43°	2	0° 20′	43° 28′	0°	43° 21′
5	103	2	89° 37′	15° 26′				90°	15° 26′
6	101	1	89° 55′	39° 40′	1	88° 55′	39° 30′	90°	39° 36′
7	201				1	89° 29′	59° 04′	90°	58° 52′
8	670				3	56° 19′	89° 32′	56° 22′	90°
9	120	4	40° 42′	90°	4	40° 49′	89° 19′	41° 15′	90°
10	5.11.0	1	38° 44′	90°				38° 33′	90°
11	130	3	29° 34′	90°	4	29° 13′	89° 05′	30° 53′	90°
12	3.11.0	1	25° 48′	90°				25° 34′	90°
13	160				1	16° 02′	89° 55′	16° 20′	90°
14	010	1	0° 05′	90°				0°	90°
15	100	2	90°	89° 42′				90°	90°

The principal faces are shown in figure 1, while all the forms observed appear on the gnomonic projection in figure 2.

Hopeite has been found in the zinc mines near Aix-la-Chapelle and at the Broken Hill mine in Rhodesia. The occurrence at the H. B. mine near Salmo, B. C., is the first recorded for the American continent.

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